WHAT IS CLAIMED IS:

1. An organic photosensitive optoelectronic device comprising:

a substrate having a first major surface and a second major surface;

at least two transparent electrode layers in superposed relationship upon said first major surface of said substrate; and

at least one photoconductive organic layer disposed between said at least two transparent electrode layers.

2. The device of claim 1 wherein the thickness of said at least one photoconductive organic layer is selected to maximize the external quantum efficiency of said device.

3. The device of claim 1 wherein the thickness of said at least one photoconductive organic layer is selected to maximize the total current output of said device.

4. The device of claim 1 wherein the thickness of said at least one photoconductive organic layer is selected to maximize the fill factor of said device.

5. The device of claim 2 wherein at least one of said transparent electrode layers comprises a non-metallic conductive layer.

6. The device of claim 2 wherein at least one of said transparent electrode layers comprises a metallic conductive layer.

7. The device of claim 5 wherein said non-metallic conductive layer is a conductive oxide.

8. The device of claim 7 wherein said conductive oxide is selected from the group consisting of indium tin oxide, tin oxide, gallium indium oxide, zinc oxide and zinc indium oxide.

9. The device of claim 8 wherein said conductive oxide is indium tin oxide.

10. The device of claim 5 wherein said non-metallic conductive layer is a conductive polymer.

11. The device of claim 10 wherein said conductive polymer is polyanaline.

12. The device of claim 5 wherein at least one of said transparent electrode layers further comprises a metallic layer disposed between said non-metallic conductive layer and said at least one photoconductive organic layer.

13. The device of claim 2 wherein at least one of said transparent electrode layers is a low resistance non-metallic cathode.

14. The device of claim 13 wherein said low resistance non-metallic cathode comprises indium tin oxide.

15. The device of claim 2 wherein at least one of said transparent electrode layers is a metallic/non-metallic composite cathode.

16. The device of claim 15 wherein said metallic/non-metallic cathode comprises indium tin oxide and magnesium silver.

17. The device of claim 12 wherein said metallic layer comprises a metal selected from the group consisting of gold, aluminum, magnesium, indium, and silver.

18. The device of claim 12 wherein said metallic layer is an alloy consisting essentially of magnesium and silver.

19. The device of claim 1 wherein said at least one photoconductive organic layer comprises an organic molecular crystal material.

20. The device of claim 19 wherein said organic molecular crystal material is selected from the group consisting of phthalocyanine compounds, perylene compounds, polyacene compounds, and porphyrin compounds.

21. The device of claim 1 wherein said at least one photoconductive organic layer comprises a polymeric material.

22. The device of claim 1 wherein said at least one photoconductive organic layer is one photoconductive organic layer.

23. The device of claim 1 wherein said at least one photoconductive organic layer is two photoconductive organic layers and said at least two electrode layers is two electrode layers.

24. The device of claim 23 wherein said two photoconductive organic layers are selected to form a photovoltaic heterojunction.

25. The device of claim 24 wherein said two photoconductive organic layers are copper phthalocyanine and perylenetetracarboxylic dianhydride.

26. The device of claim 24 wherein said two photoconductive organic layers are copper phthalocyanine and 3,4,9,10-perylenetetracarboxylic-bis-benzimidazole.

27. The device of claim 25 wherein said transparent electrode layers comprise indium tin oxide.

28. The device of claim 26 wherein said transparent electrode layers comprise indium tin oxide.

29. The device of claim 1 wherein said at least one photoconductive organic layer is four photoconductive organic layers, having an inner pair and an outer pair and said at least two transparent electrode layers is two transparent electrode layers.

30. The device of claim 29 wherein said inner pair of said four photoconductive organic layers is a pair of photoconductive organic dyes selected to form a photovoltaic heterojunction and selected to have spectral sensitivity in a specified region of the electromagnetic spectrum.

31. The device of claim 30 wherein said pair of photoconductive organic dyes comprises aluminum *tris*(8-hydroxyquinoline) and 4,4'-bis[N-(1-napthyl)-N-phenyl-amino]biphenyl.

32. The device of claim 30 wherein at least one of said outer pair of said four photoconductive organic layers comprises an organic molecular crystal material.

33. The device of claim 30 wherein at least one of said outer pair of said four photoconductive organic layers comprises a polymeric material.

34. The device of claim 30 wherein at least one of said outer pair of said four photoconductive organic layers comprises a material selected from the group consisting of phthalocyanine compounds, perylene compounds, polyacene compounds, and porphyrin compounds.

35. The device of claim 31 wherein each of said outer pair of said four photoconductive organic layers comprises a material selected from the group consisting of copper phthalocyanine, perylenetetracarboxylic dianhydride and 3,4,9,10-perylenetetracarboxylic-bis-benzimidazole.

36. The device of claim 23 wherein said two photoconductive organic layers is a pair of organic dyes selected to form a photovoltaic heterojunction and selected to have spectral sensitivity in a specified region of the electromagnetic spectrum.

37. The device of claim 36 wherein said two transparent electrode layers are non-metallic conductive layers and further comprising a metallic layer disposed between each photoconductive organic dye layer and the adjacent transparent electrode layer.

38. The device of claim 2 further comprising a resistive load.

39. The device of claim 2 further comprising a power supply.

40. The device of claim 1 wherein the at least one photoconductive organic layer is a plurality of photoconductive organic layers selected to form a plurality of interfaces for dissociating excitons.

41. The device of claim 40 wherein the thicknesses of said plurality of photoconductive organic layers are selected to alter said molecular energy levels of excitons so as to form multiple quantum wells in said plurality of photoconductive organic layers.

42. The device of claim 40 wherein said plurality of photoconductive organic layers are selected from the group consisting of organic molecular crystal materials and polymeric materials.

43. The device of claim 40 wherein said plurality of photoconductive organic layers are selected from the group consisting of phthalocyanine compounds, perylene compounds, polyacene compounds, and porphyrin compounds.

44. The device of claim 40 wherein said plurality of photoconductive organic layers are selected from the group consisting of copper phthalocyanine, perylenetetracarboxylic dianhydride, 3,4,9,10-perylenetetracarboxylic-bis-benzimidazole, and vanadyl phthalocyanine.

45. The device of claim 2 wherein said substrate is a substantially flexible material.

46. The device of claim 2 wherein said substrate is a substantially rigid material.

47. The device of claim 2 wherein said substrate is a transparent material.

48. The device of claim 2 wherein said substrate is a substantially opaque material.

49. The device of claim 2 wherein said substrate is a substantially reflective material.

50. The device of claim 2 as a part of a multipixel photodetector.

51. A method of generating electrical power from ambient electromagnetic radiation comprising:

electrically attaching an organic photovoltaic device having at least two transparent electrode layers to a resistive load; and

exposing said device to electromagnetic radiation.

52. A method of detecting electromagnetic radiation comprising:

electrically attaching an organic photodetector having at least two transparent electrode layers to a detecting circuit;

providing electrical power to said detecting circuit;

exposing said photodetector to ambient electromagnetic radiation; and

receiving electronic signals corresponding to said ambient electromagnetic radiation from said detecting circuit.

53. An electronic device incorporating the device of claim 1, said electronic device selected from the group consisting of a radio, a television, a computer, a calculator, a telephone, a wireless communication device, a watch, an emergency location device, an electric vehicle, an emergency power supply, a power generation device, a monitoring device, an inspection device, a radiation detector, an imaging device, and an optical coupling device.

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